The objectives of this study were to examine the size distribution of aerosol particles as well as the investigation of the elemental composition of Particulate Matter (PM) in rural and urban areas in El-Minia governorate, Upper Egypt. Low pressure Berner cascade impactor was used to collect aerosol particles in different size range (cutoff diameter 0.08-6 μm). Seven elements were investigated (Ca, Ba, Fe, K, Cu, Mn and Pb) using atomic absorption technique. Elemental mass size distributions (Pb, Mn, Fe, Cu, K, Ca and Ba) at both sites were presented. These were founded as a bimodal log normal mass size distribution corresponding to accumulation and coarse modes. Average mass concentrations of different elements at rural and urban sites also were represented.

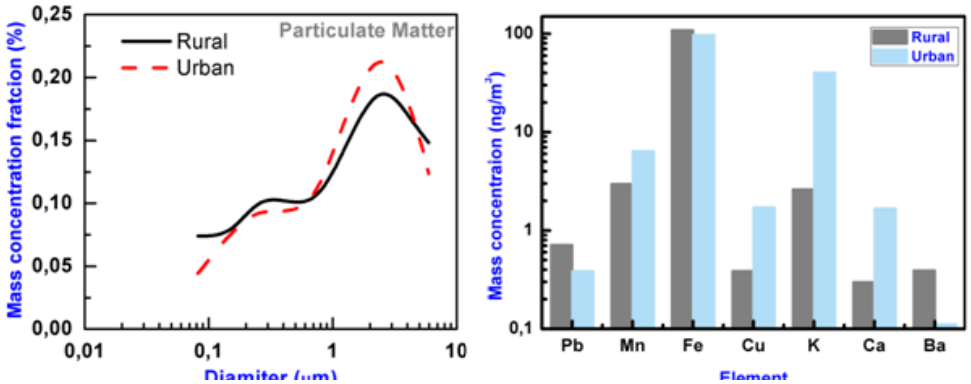

Fig. 1. Average PM size distributions and elemental mass concentration of aerosol particles at rural and urban sites

1. Ellouz, F.; Masmoudi, M.; Quisefit, J.P.; Medhioub K. Phys Chem Earth. **2013**, 55, 35-42.

HPGE-DETECTOR AS THE BASE OF RADON CONCENTRATION STANDARD SOURCE

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The purpose of this work is to introduce a simple and accurate system for calibrating radon measurement devices for monitoring the activity concentration of ^{222}Rn in air. A high-purity germanium (HPGe) detector connected with ^{226}Ra solid source to produce this simple prototype calibration system. A small emanation box was mounted on the HPGe detector for online gamma measurements. Inside this box, a solid ^{226}Ra standard source was placed.

A high purity germanium (HPGe) detector is used to measure the absolute activity of ^{226}Ra with online controlling of radon emanation (by measuring the ^{214}Bi activity, progeny of ^{226}Ra) to produce the released absolute activity of ^{222}Rn. This prototype of a calibration system was tested using AlphaGUARD (PQ2000Pro) monitor in opened and closed system with different ^{226}Ra source. Using the developed radon standard system, the calibration of radon measurement devices is considerably simplified and the measurement accuracy is improved [1].

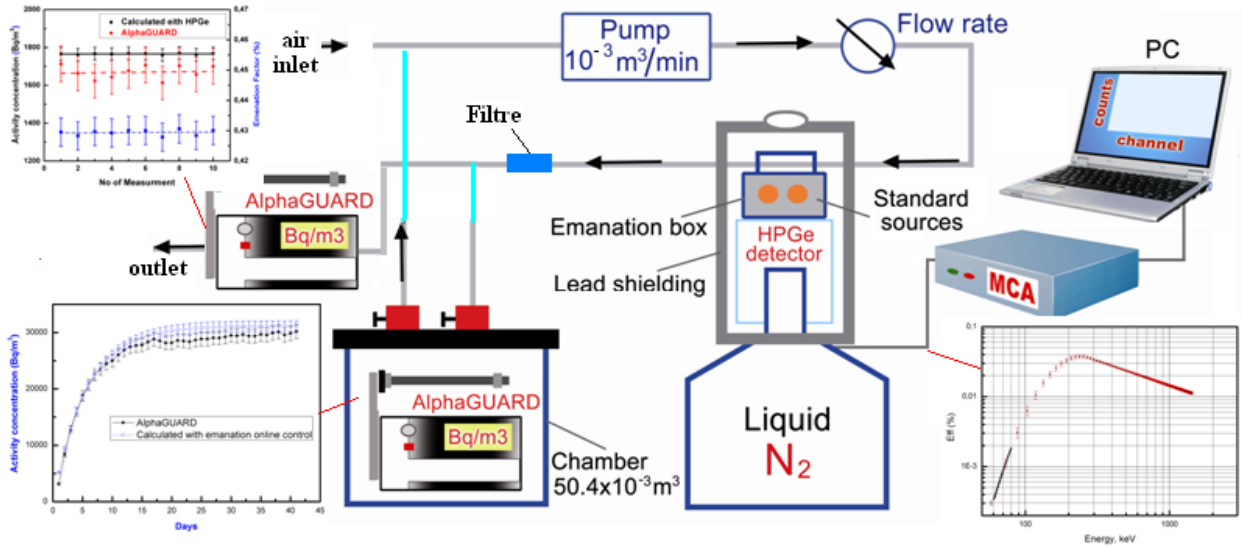

Fig. 1. Schematic of the experimental arrangement for open and close system for radon concentration standard.

1. Mostafa, Y. A., M. Vasyanovich, M., Zhukovsky, M. Appl. Radiat. Isot. 107, 109-112 (2016)

PHASE TRANSITIONS IN SILICON FROM 16 GPa UP TO 50 GPa

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Silicon has been studied under high pressure for a long time, his phase diagram is built up to 230 GPa and there are about 12 high pressure phases. But still remains question about lattice structure under range of compression from 30 GPa to 40 GPa. For example, Yuri B. Zaporozhets and You-Xiang Zhao emphasize only one phase transition at 40 GPa, which coincides transition from hexagonal lattice (Si—IV) to close-packed hexagonal lattice (Si—VII). Existence of the hexagonal transition up to 34 GPa is indicated by Qingyang Fan [1] and H. Olijnyk [2]. And still lives uncertain area Si—VII at 40 GPa, which afterwards were identified as Si—VI. Nowadays sci-